WHAT IS CLAIMED IS:

1. A torque detector for detecting torque that is produced when a steering shaft of a vehicle is rotated, the torque detector comprising:

a detection element for detecting steering torque that is applied to the steering shaft when the steering shaft is rotated to generate an analog torque signal corresponding to the steering torque;

a converter connected to the detection element to convert the analog torque signal to a digital torque signal; and

a hysteresis processor connected to the converter to perform hysteresis processing on the digital torque signal so that a value of the digital torque signal is included in a predetermined range.

2. The torque detector according to claim 1, wherein:

the hysteresis processor continuously receives the digital torque signal to perform hysteresis processing;

when a change amount that is the difference between a value of the currently received digital torque signal and the value of the digital torque signal previously subjected to the hysteresis processing is included in the predetermined range, the hysteresis processor uses the value of the digital torque signal subjected to the previous hysteresis processing as the value of the digital torque signal subjected to the current hysteresis processing; and

when the change amount is excluded from the predetermined range, the hysteresis processor adds the value of the digital torque signal subjected to the previous hysteresis processing to the difference between the change amount and the predetermined range, and sets that as the

value of the digital torque signal of the current hysteresis processing.

3. A torque detector for detecting torque that is produced when a steering shaft of a vehicle is rotated, the torque detector comprising:

a detection element for detecting steering torque that is applied to the steering shaft when the steering shaft is rotated to generate an analog torque signal corresponding to the steering torque;

a converter connected to the detection element to convert the analog torque signal to a digital torque signal; and

a calculation unit connected to the converter to continuously receive the digital torque signal from the converter and perform a predetermined calculation process on the digital torque signal, wherein the calculation unit includes:

an averaging processor connected to the converter to perform averaging processing on at least one value of the digital torque signal received in the past and the value of the currently received digital torque signal;

a determiner for determining the relationship between a predetermined threshold value and the value of the digital torque signal averaged by the averaging processor; and

a hysteresis processor for performing hysteresis processing on the currently received digital torque signal to include the currently received digital torque signal in a predetermined range when the determiner determines that the value of the averaged digital torque signal is greater than the predetermined

threshold value.

4. The torque detector according to claim 3, wherein:

the hysteresis processor continuously receives the digital torque signal to perform hysteresis processing;

when a change amount that is the difference between a value of the currently received digital torque signal and the value of the digital torque signal previously subjected to the hysteresis processing is included in the predetermined range, the hysteresis processor uses the value of the digital torque signal subjected to the previous hysteresis processing as the value of the digital torque signal subjected to the current hysteresis processing; and

when the change amount is excluded from the predetermined range, the hysteresis processor adds the value of the digital torque signal subjected to the previous hysteresis processing to the difference between the change amount and the predetermined range and sets that as the value of the digital torque signal of the current hysteresis processing.

5. An electric power steering controller for assisting operation of a vehicle steering device, the steering device including a steering shaft connected to a steering wheel, the electric power steering controller comprising:

a torque detector for detecting torque that is produced when the steering shaft is rotated, the torque detector including:

a detection element for detecting steering torque that is applied to the steering shaft when the steering shaft is rotated to generate an analog torque signal corresponding to the steering torque;

a converter connected to the detection element to convert the analog torque signal to a digital torque signal; and

a hysteresis processor connected to the converter to perform hysteresis processing on the digital torque signal so that a value of the digital torque signal is included in a predetermined range;

an electric motor connected to the torque detector to generate motor torque that is added to the steering force of the steering shaft; and

a motor controller connected to the torque detector and the electric motor for obtaining the motor torque corresponding to a digital torque signal subjected to the hysteresis processing and controlling the motor.

6. The electric power steering controller according to claim 5, wherein:

the hysteresis processor continuously receives the digital torque signal to perform hysteresis processing;

when a change amount that is the difference between a value of the currently received digital torque signal and the value of the digital torque signal previously subjected to the hysteresis processing is included in the predetermined range, the hysteresis processor uses the value of the digital torque signal subjected to the previous hysteresis processing as the value of the digital torque signal subjected to the current hysteresis processing; and

when the change amount is excluded from the predetermined range, the hysteresis processor adds the value of the digital torque signal subjected to the previous hysteresis processing to the difference between the change amount and the predetermined range and sets that as the value of the digital torque signal of the current hysteresis

processing.

7. An electric power steering controller for assisting operation of a vehicle steering device, the steering device including a steering shaft connected to a steering wheel, the electric power steering controller comprising:

a torque detector for detecting torque that is produced when the steering shaft is rotated, the torque detector including:

a detection element for detecting steering torque that is applied to the steering shaft when the steering shaft is rotated to generate an analog torque signal corresponding to the steering torque;

a converter connected to the detection element to convert the analog torque signal to a digital torque signal; and

a calculation unit connected to the converter to continuously receive the digital torque signal from the converter and perform a predetermined calculation process on the digital torque signal, wherein the calculation unit includes:

an averaging processor connected to the converter to perform averaging processing on at least one value of the digital torque signal received in the past and the value of the currently received digital torque signal;

a determiner for determining the relationship between a predetermined threshold value and the value of the digital torque signal averaged by the averaging processor; and

a hysteresis processor for performing hysteresis processing on the currently received

digital torque signal to include the currently received digital torque signal in a predetermined range when the determiner determines that the value of the averaged digital torque signal is greater than the predetermined threshold value;

an electric motor connected to the torque detector to generate motor torque that is added to the steering force of the steering shaft; and

a motor controller connected to the torque detector and the electric motor for obtaining the motor torque of the electric motor, wherein the motor controller obtains the motor torque corresponding to the digital torque signal subjected to the hysteresis processing when the determiner determines that the averaged value of the digital torque signal is greater than the threshold value, and the motor controller obtains the motor torque corresponding to the averaged value of the digital torque signal when the determiner determines that the average value of the digital torque signal is less than or equal to the threshold value.

8. The electric power steering controller according to claim 7, wherein:

when a change amount that is the difference between a value of the currently received digital torque signal and the value of the digital torque signal previously subjected to the hysteresis processing is included in the predetermined range, the hysteresis processor uses the value of the digital torque signal subjected to the previous hysteresis processing as the value of the digital torque signal subjected to the current hysteresis processing; and

when the change amount is excluded from the predetermined range, the hysteresis processor adds the value of the digital torque signal subjected to the previous

hysteresis processing to the difference between the change amount and the predetermined range and sets that as the value of the digital torque signal of the current hysteresis processing.

9. A torque detector for detecting torque that is produced when a shaft is rotated, the torque detector comprising:

a detection element for detecting the torque that is applied to the shaft when the shaft is rotated to generate a torque signal corresponding to the torque; and

a calculation unit connected to the detection element to perform hysteresis processing on the torque signal so that a value of the torque signal is included in a predetermined range.

10. The torque detector of Claim 9, wherein:

the calculation unit continuously receives the torque signal to perform the hysteresis processing;

in the hysteresis processing, when a change amount that is the difference between a value of the currently received torque signal and the value of the torque signal previously subjected to the hysteresis processing is included in the predetermined range, the calculation unit uses the value of the torque signal subjected to the previous hysteresis processing as the value of the torque signal subjected to the current hysteresis processing; and

in the hysteresis processing, when the change amount is excluded from the predetermined range, the calculation unit adds the value of the torque signal subjected to the previous hysteresis processing to the difference between the change amount and the predetermined range and sets that as the value of the torque signal of the current hysteresis

processing.

11. The torque detector according to claim 9, wherein:

the calculation unit continuously receives the torque signal to perform the hysteresis processing, the calculation unit including:

an averaging processor for performing averaging processing on at least one value of the torque signal received in the past and the value of the currently received torque signal; and

a determiner for determining the relationship between a predetermined threshold value and the value of the torque signal averaged by the averaging processor, wherein the calculation unit performs hysteresis processing on the currently received torque signal to include the currently received torque signal in a predetermined range when the determiner determines that the value of the averaged torque signal is greater than the predetermined threshold value.

12. The torque detector according to claim 11, wherein:

in the hysteresis processing, when a change amount that is the difference between a value of the currently received torque signal and the value of the torque signal previously subjected to the hysteresis processing is included in the predetermined range, the calculation unit uses the value of the torque signal subjected to the previous hysteresis processing as the value of the torque signal subjected to the current hysteresis processing; and

in the hysteresis processing, when the change amount is excluded from the predetermined range, the calculation unit adds the value of the torque signal subjected to the

previous hysteresis processing to the difference between the change amount and the predetermined range and sets that as the value of the torque signal of the current hysteresis processing.

13. A method for detecting torque that is produced when a shaft is rotated, the method comprising:

detecting the torque applied to the shaft when the shaft is rotated;

generating a torque signal corresponding to the detected torque; and

performing hysteresis processing on the torque signal to include the value of the torque signal in a predetermined range.

14. The method according to claim 13, wherein:

said generating a torque signal includes generating the torque signal a plural number of times;

said performing hysteresis processing includes:

performing hysteresis processing each time the torque signal is produced:

generating a change amount that is the difference between a value of the currently received torque signal and the value of the torque signal previously subjected to the hysteresis processing;

determining whether the change amount is included in the predetermined range;

when the change amount is included in the predetermined range, using the value of the torque signal subjected to the previous hysteresis processing as the value of the torque signal subjected to the current hysteresis processing; and

when the change amount is excluded from the

predetermined range, adding the value of the torque signal subjected to the previous hysteresis processing to the difference between the change amount and the predetermined range and setting that as the value of the torque signal of the previous hysteresis processing.